A CORRELATION STUDY OF TWO ADOLESCENT LANGUAGE TESTS

A Thesis

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ANN MARIE CORNELIA HEFFRON

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Ann Marie Cornelia Heffron

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APPROVED BY:

C. C. Hutchinson
Chairperson, Thesis Committee

M. Jane Lieberman
Member, Thesis Committee

Thomas W. Simon
Member, Thesis Committee

C. C. Hutchinson
Chairperson, Department of
Speech Pathology and Audiology

Joyce V. Lawrence
Dean of the Graduate School

ABSTRACT

A CORRELATION STUDY OF TWO ADOLESCENT

LANGUAGE TESTS

Ann Marie C. Heffron, B.S., Appalachian State University

M.A., Appalachian State University

Thesis Chairperson: Dr. E.C. Hutchinson

The purposes of this study were to determine if there was a signifcant correlation between the Test of Adolescent Language and the Fullerton Language Test for Adolescents, and to determine if these tests were significantly correlated with academic performance and school achievement.

The 30 subjects were selected from two sixth grade classes in a rural district of Ashe County, North Carolina. Each subject was given the Fullerton Language Test for Adolescents individually. Two subtests of the Test of Adolescent Language were given individually and the remaining six subtests were given to all 30 subjects in a group.

The data were analyzed by means of the Pearson product moment correlation and the Spearman rank correlation coefficient. The two adolescent language tests demonstrated a significant correlation at the .05 level of significance, (r=.8209, p=.000). From these results it can be concluded that the Test of Adolescent Language and the Fullerton Language Test for Adolescents are testing the same areas of language. The two adolescent language tests were also significantly correlated with academic performance and school achievement. A factor analysis revealed that three language behaviors were being tested: grammatic features

and auditory memory, semantic feature (vocabulary), and semantic feature associated with changes in meaning.

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CHAPTER I

INTRODUCTION

Language can be defined as a system of symbols that are socially agreed upon and governed by rules which are used to represent one's knowledge of the world (Gerber & Bryen, 1981). In addition to, and complementing this symbolic function, language has a communicative function, which is also a rule-governed system (Gerber & Bryen, 1981). Communication involves the ability to receive a message and process it with an understanding of the speaker's viewpoint. An individual must be able to realize the existence of another viewpoint, but must also keep one's own viewpoint in mind (Gerber & Bryen, 1981).

The ability to communicate effectively is very important, and is of high priority for the adolescent. Adolescence is also a time when an individual is trying to mature and become part of the adult world. The adolescent is leaving childhood behind and is developing more of an abstract thinking process rather than the concrete thinking that existed during childhood. The adolescent becomes less dependent on the family and importance is placed on developing relationships within the peer group which serves as a support system (Cook, 1979).

This transformation into the adult world will build the self-concept if it is reached successfully. Being able to communicate effectively is a stepping stone into the adult world. When a person knows an idea can be communicated effectively by holding another person's attention, a sense of self worth is developed. In order to know that a message is being interpreted correctly, an individual must be

able to perceive the receiver's verbal and nonverbal cues. However, an adolescent who has a language-learning disability may not be aware of these cues because of problems in social perception. This deficit limits the ability to interpret and respond appropriately to verbal and nonverbal cues (Wiig & Semel, 1980).

Studies which compare the social relationships of children with learning disabilities and normal children have revealed that children with learning disabilities are more likely to be rejected by peers and considered less adequate by others (Bryan, 1977). Other adolescents who are high achievers do not want to be associated with someone who is considered "different," referring to the adolescent with a learning disability. The adolescent who has a learning disability is aware of these deficiencies and may not be able to compensate for them, which then may result in a distorted sense of self and a failure to develop a sense of competency to interact and control the environment (Cook, 1979). The adolescent must be self-confident and learn to deal with the environment in order to become an independent adult. When the adolescent enters the adult world, the challenges of obtaining a job require a good attitude about oneself and the existing capabilities and deficiencies that one may have.

An individual must have the ability to communicate in order to learn, therefore, communication problems may cause the learning disabled academic problems (Leonard, Prutting, Perozzi, & Berkley, 1978). These communication deficits interfere with the interpretation and production of messages and affects all areas of learning as well as all

interpersonal interactions (Wiig & Semel, 1980). Therefore, any area of learning which requires the ability to use language may be affected. It is evident from the definition of learning disabilities in Public Law 94-142 that individuals who have specific learning disabilities may also have problems in language which in turn will affect the ability "to listen, think, speak, read, write, spell, or do mathematical calculations"(USOE, 1979).

Weiner (1974) was concerned with the effect a language problem had on children later in life, both academically and socially. He conducted a case study of a boy with a severe language delay and found that the subject's peers ignored him and that his dependency on the family was greater than that found with most adolescents. "Indeed, the pervasiveness of the effects of his language deficiencies was striking. It affected his communication, education, and social adjustment (resulting in his relative isolation from his peers) (Weiner, 1974)." The results of Weiner's study support the previous statements of Bryan (1977) and Wiig & Semel (1980). Weiner conducted this case study because of the perceived lack of research on the adolescent population. Weiner observed that most research investigated the language skills of younger children when the language problem may be more evident.

The majority of research on language has been concerned with the language development of the infant (Smith & Oller, 1981), pre-school and elementary school children (Prutting, 1979, Nelson & Weber-Olsen, 1980, Haniff & Siegel, 1981) and the adult (Duffy & Liles, 1979, Hegde & McConn, 1981, Shewan & Kertesy, 1980). Only limited research has

focused on the language development of the adolescent population.

> Research relating to the language of adolescents has lagged far behind that undertaken with children. The primary reason for this lag is that there was no standardized, reliable, and valid assessment devices available that could be used to provide a comprehensive view of language behavior (Hammill, Brown, Larsen, & Wiederholt, 1980, p. 7).

Public Law 94-142 put into effect services for the handicapped from the ages of 3 to 21 (USOE, 1977). Responding to this mandate, the Test of Adolescent Language (Hammill, 1980) and the Fullerton Language Test for Adolescents (Thorum, 1980) have been developed specifically to measure adolescent language.

This study had two purposes. The first purpose was to determine if the Test of Adolescent Language and the Fullerton Language Test for Adolescents test the same areas of language. The second purpose was to examine the relationship of performance on these two language tests to academic and achievement test performance.

Hypotheses

To give direction to the data analysis, the following hypotheses, stated in the null form were tested at the .05 level of significance.

Hypothesis 1

There is not a significant correlation between performance on the Test of Adolescent Language and the Fullerton Language Test for Adolescents.

Hypothesis 2

There is not a significant correlation between the total performance on the Test of Adolescent Language, the Fullerton Language Test for Adolescents and academic performance.

Hypothesis 3

There is not a significant correlation between the total performance on the Test of Adolescent Language, the Fullerton Language Test for Adolescents and the California Achievement Test.

LIMITATIONS

1. Generalizations should be made with care from this study due to the limited population tested.
2. Formal testing does not allow individual assessment of spontaneous language production in various situations.

DEFINITIONS

1. Assessment - Evaluation of performance through the administration of standardized tests in specific or overall areas of ability.
2. Reading - The ability to understand written/graphic messages.
3. Writing - The ability to express one's thoughts graphically.
4. Speaking - The ability to express ideas orally.
5. Listening - The ability to comprehend spoken language.
6. Adolescent - An individual who is in the state of adolescence, the period of life from puberty to maturity, from the age of 11 to 18 years of age.

CHAPTER II

REVIEW OF RELATED LITERATURE

Researchers who are concerned with the language processing abilities of the adolescent, particularly learning-disabled adolescents, have found that there is a limited amount of data available on this subject (Deschler, 1974, Hallahan, Cohen & Kauffman, 1977, Moran, 1981, Wiig & Roach, 1975). These researchers have conducted studies to identify various language deficits that the adolescent may have. In each study, the researchers have commented on the lack of research on this population with regard to language abilities and deficits. Mann, Goodman, & Wiederholt (1978) believe that the unavailability of data on the language abilities of the adolescent is due to the fact that there were few instruments available that could provide complete diagnostic information. The majority of research on language tests has been concerned with instruments that are developed for pre-school and elementary school children (Hutcherson, 1978, Raskin, Offenbach & Black, 1974, and Winitz, 1959) and for adults (Porch, 1971, Schuell, Jenkins & Carroll, 1962, and Sklar, 1963). These studies give evidence of the validity and reliability of the test instruments and how they correlate with other standardized instruments.

It becomes increasingly important that problems be identified at the junior-senior high school level because of the increase in the number of "under-achievers" to the total school population following

the move from elementary school to high school (Deschler, 1978). The Office of Special Education has estimated the prevalence of learning disabilities to be three percent (United States Office of Education, 1979). The Department of Education collected data for the school year 1977-78 involving children between the ages of 3 to 21. Of all the handicapped children identified, learning disabled children were found to account for 25.7 percent of this population and 1.89 percent of the total school-aged population. Since it is estimated that 3 percent of school-aged children are learning disabled, from the figure presented there is still 1.11 percent that are unserved (Lerner, 1981). There must be an explanation why these students are not being served. Arter and Jenkins (1981) believe that the assessment techniques that are used to identify specific strengths and weaknesses are either inadequate or not useful in the remediation of academic problems.

There are only a few diagnostic test instruments that have been established for the adolescent population. Wiig and Semel (1975) conducted an experiment to determine the productive language abilities of learning disabled adolescents. The areas assessed were: semantic production, sentence formulation, and word definitions. However, there was no single, standardized language test that could assess these abilities for the adolescent population. The experimenters had to resort to selecting subtests from three different test instruments on aphasia (Goodglass & Kaplan, 1972, Schuell, 1965) and learning aptitude (Baker & Leland, 1959). Without any tests or norms established for this population a complete description of language production cannot be made

(Irwin, Moore, & Rampp, 1972). One single, standardized test with age norms for this particular population would give more precise information and an overall view of the language abilities of the adolescent. To develop an effective approach for remediation, the first step must be accurate assessment of the nature of the adolescent's language problems (Mann, Goodman, & Widerholt, 1978). It is evident that standardized test instruments are needed that will give an overall view of the language abilities of the adolescent.

THE TEST OF ADOLESCENT LANGUAGE

The Test of Adolescent Language was developed to serve four purposes (Hammill, 1980). The major goal was to evaluate the adolescent's language proficiency and to identify those individuals who were experiencing problems in communicating with others. Secondly, the Test of Adolescent Language was designed to determine the specific strengths and weaknesses of the adolescent. Thirdly, it provides a way of monitoring an individual's therapy progress and fourth, it provides a standardized test that will aid in the research of the various aspects and nature of adolescent language. With the use of this test, the relationship between language abilities and academic performance could be determined.

Hammill (1980) built the Test of Adolescent Language on a three-dimensional model. The test model includes features, systems, and forms. This model includes the four modalities through which language is processed and produced: reading, writing, speaking, and listening. The features are the semantic and syntactic aspects of language. These

terms are referred to as vocabulary and grammar. Therefore, all the subtests that are derived from the semantic feature have vocabulary as its content and those subtests based on the syntactic feature have a grammatic content (Hammill, 1980).

The form of the Test of Adolescent Language refers to the type of message being interpreted or produced (Hammill, 1980). The subtests in this test measure an aspect of written or spoken language. The systems being measured are the receptive and expressive components of language. Table 1, Relationship of the TOAL to the Test Model, shows the subtests as they are developed from the test model.

Hammill (1980) does not report that the Test of Adolescent Language was developed from any particular theory, but, rather that the test was developed from theoretical information from several sources, including, Bloom and Lahey (1978), Vygotsky (1977), Chomsky (1965, 1957) and Smith (1975, 1971) among others. The Test of Adolescent Language has been developed for the ages of 11 years to 18 years 5 months of age.

Scoring

The Test of Adolescent Language is scored using basal and ceiling scores. The basal score for all the subtests is that point when the student passes five items in a row. The ceiling score is that point where the student misses three of five consecutive numbered responses. Students are arbitrarily given credit for all items below the basal score. The students are recorded as missing all items above the ceiling score (Hammill, 1980).

TABLE 1

RELATIONSHIP OF THE TOAL SUBTESTS

TO THE TEST MODEL

Form	System	Feature	TOAL Subtest Name
Spoken	Receptive	Vocabulary	Listening/Vocabulary
Spoken	Receptive	Grammar	Listening/Grammar
Spoken	Expressive	Vocabulary	Speaking/Vocabulary
Spoken	Expressive	Grammar	Speaking/Grammar
Written	Receptive	Vocabulary	Reading/Vocabulary
Written	Receptive	Grammar	Reading/Grammar
Written	Expressive	Vocabulary	Writing/Vocabulary
Written	Expressive	Grammar	Writing/Grammar

(Hammill, 1980)

The test gives an Adolescent Language Quotient (ALQ) which is determined from the sum of the scaled scores of the eight subtests. Two profile charts are provided, one for the individual subtests and the other for the composite scores. Table 2, Composition of Composite Variables, shows how the subtests are grouped into composite variables. See Appendix A for the description of the individual subtests of the Test of Adolescent Language.

VALIDITY AND RELIABILITY

Hammill (1980) determined the criterion-related validity of the Test of Adolescent Language by examining the correlation of it with five other criterion tests: 1) Peabody Picture Vocabulary Test r=.62, (Dunn, 1965); 2) the Memory for Related Syllables subtest from the Detroit Tests of Learning Aptitude r=.59, (Baker & Leland, 1959); 3) the Reading Total and Language Totals from the California Test of Basic Skills, r=.85: reading total, r=.66: language total, (California Test Bureau, 1968); and 4) the Total Score from the Test of Written Language, r=.67, (Hammill & Larsen, 1978). These results indicated that the Test of Adolescent Language is correlated with criterion tests which support its criterion validity (Hammill, 1980).

Hammill (1980) determined the internal consistency reliability of the items on the TOAL using Coefficient Alpha. The more the items relate to each other, the smaller the test error should be, therefore, its scores should approximate or exceed .80. Forty subjects were selected in grades 6-12. The Coefficient Alpha was applied to the scores and the results showed that 70 percent of the reported coefficients reached

TABLE 2

COMPOSITION OF COMPOSITE VARIABLES

Composite Variables	TOAL Subtests
1. Listening	(1) Listening/Vocabulary (2) Listening/Grammar
2. Speaking	(1) Speaking/Vocabulary (2) Speaking/Grammar
3. Reading	(1) Reading/Vocabulary (2) Reading/Grammar
4. Writing	(1) Writing/Vocabulary (2) Writing/Grammar
5. Spoken Language	(1) Listening/Vocabulary (2) Listening/Grammar (3) Speaking/Vocabulary (4) Speaking/Grammar
6. Written Language	(1) Reading/Vocabulary (2) Reading/Grammar (3) Writing/Vocabulary (4) Writing/Grammar
7. Vocabulary	(1) Listening/Vocabulary (2) Speaking/Vocabulary (3) Reading/Vocabulary (4) Writing/Vocabulary
8. Grammar	(1) Listening/Grammar (2) Speaking/Grammar (3) Reading/Grammar (4) Writing/Grammar
9. Receptive Language	(1) Listening/Vocabulary (2) Listening/Grammar (3) Reading/Vocabulary (4) Reading/Grammar
10. Expressive Language	(1) Speaking/Vocabulary (2) Speaking/Grammar (3) Writing/Vocabulary (4) Writing/Grammar

(Hammill, 1980)

the minimum level of .80. The error variance reported shows that the Test of Adolescent Language has sufficient internal reliability.

FULLERTON LANGUAGE TEST FOR ADOLESCENTS

The Fullerton Language Test for Adolescents evolved from the Communicatively Handicapped Adolescent Population project which had a primary mandate to develop a speech and language program for the adolescent population (Thorum, 1980). One of the major aspects of the project was to develop a language test that would help determine the language deficiencies of the adolescent. A field study edition was developed in 1977 and administered to an adolescent population (Thorum, 1980). The field study edition was refined and appeared as the Experimental Edition of the Fullerton Language Test for Adolescents.

The Fullerton Language Test for Adolescents is divided into eight subtests:

1. Auditory Synthesis
2. Morphology Competency
3. Oral Commands
4. Convergent Production
5. Divergent Production
6. Syllabication
7. Grammatic Competency
8. Idioms (Thorum, 1980)

See Appendix B for the description of the individual subtests. The Oral Command and Syllabication subtests examine receptive language and the six other subtests examine expressive language. The Fullerton Language Test for Adolescents is designed for ages 11 to 18 and is administered individually (Thorum, 1980).

SCORING

The scoring process involves giving a (1) for a correct response and a (0) for an incorrect response. Thorum (1980) developed a Performance Profile which is derived from the raw scores. The profile is divided into three levels: 1) Competence level - capable of doing the particular skill; 2) Instruction level - has the needed skills for the task but needs further instruction; 3) Frustration level - does not exhibit the skills necessary to perform the task, so instruction should begin at a very basic level.

There is no evidence readily available which suggests that the Fullerton Language Test for Adolescents is derived from any particular theory or model of language. The authors of the test developed it through empirical research on adolescent language. However, two of the subtests, Divergent and Convergent Production, are similar to the areas of language in Guilford's Structure of Intellect model, but there is no evidence to prove that the developers of this test used this model as a basis.

VALIDITY AND RELIABILITY

Thorum (1980) determined the reliability of the Fullerton Language Test for Adolescents through the use of a coefficient of stability (test-retest) and a coefficient of internal consistency (split-half). The test-retest approach for measuring the reliability of a test instrument involves a complete repetition of the test and a comparison between the two administrations (Ventry & Schiavetti, 1980). The reliability is then defined by the Pearson Product Moment Correlation

between the two sets of scores (Roscoe, 1975). The split-half method for measuring reliability involves dividing the test into two halves, for instance, by odd and even numbered items. Then a correlation is made between the two parts. Thorum (1980) used the Kuder-Richardson method for the coefficient of internal consistency.

The results of the Pearson Product Moment Correlation for the coefficient of stability yielded significant values beyond the .01 level of confidence and exceeded .80 for each subtest, which showed that the Fullerton Language Test for Adolescents yields stable scores (Thorum, 1980). The coefficient of internal consistency study resulted in values ranging from .70 to .80 which indicated that the items in each subtest tended to measure the same language process (Thorum, 1980).

Thorum (1980) also determined the content and item validity and the diagnostic validity for the Fullerton Language Test for Adolescents. The content validity was justified through the researching of other language tests. A minimum of four language tests were reported to be similar in content to those developed for this test with the exception of the Idioms subtest.

To determine diagnostic validity a t-test was applied to the scores of two groups of adolescents. One group was functioning in the regular classroom and one group was placed in various special education classes. The results of the analysis revealed a .001 level of significant discrimination between the two groups. These results indicate that the Fullerton Language Test for Adolescents was a good determiner of those individuals experiencing difficulty with language skills (Thorum, 1980).

CHAPTER III

PROCEDURE

SUBJECTS

The subjects for this study were 30 sixth grade students, ranging in ages from 11 years 6 months to 12 years 5 months. The mean age was 11 years 9 months. The subjects were selected from two sixth grade classes in a rural district of Ashe County, North Carolina. Consent forms were given to 60 students and of the 39 returned 30 were randomly selected.

METHOD

There were seven examiners, the experimenter and six additional examiners. The experimenter was self-trained through practice and thorough examination of the test manuals. The experimenter conducted a training session for the additional examiners which consisted of viewing a videotape of the tests being administered and explaining the scoring techniques being explained by the experimenter. After the videotape, each examiner was required to administer and score a portion of each test. Through this examination, it was subjectively determined by the experimenter that each examiner could administer and score each test.

Each subject was administered the Test of Adolescent Language, the Fullerton Language Test for Adolescents and also the Clinical Evaluation of Language Functions, which was part of a continuing

project dealing with adolescent language tests being conducted by West (1982).

The individual administration of the Fullerton Language Test for Adolescents took approximately 45 minutes per subject. The two individual subtests of the Test of Adolescent Language, Speaking/Vocabulary and Speaking/Grammar, took approximately 5 to 10 minutes per subject. The remaining six subtests were given to all 30 subjects in a group on the final day of testing and this took approximately two hours allowing for a break in testing.

The order of testing shows that 80 percent of the 30 subjects were given the Fullerton Language Test for Adolescents first, followed by the two individual subtests of the Test of Adolescent Language and finally the remaining six subtests contained in this test. The tests were given in this order due to the limited amount of time and number of examiners.

To administer all the tests required six days of testing conducted over a two-week period. The subjects were given one test per day. See Appendix C for order of testing.

The academic grades and achievement scores from the California Achievement Test were collected from 17 of the subjects who agreed to have these scores examined for the purpose of this study. Academic performance is summarized in Table 3 and CAT scores are in Table 4. The California Achievement Test scores are those which the subjects obtained in the Spring of 1981. The academic scores are those which the subjects received on the report cards for the Winter of 1982.

TABLE 3

INDIVIDUAL ACADEMIC GRADES

Subject #	Reading	Language	Spelling	Handwriting	Social Studies	Math	Science
1	4	5	5	4	4	5	4
2	3	4	3	3	3	2	3
4	5	5	5	4	5	5	4
7	3	3	3	5	3	3	4
10	5	4	5	4	4	4	4
13	3	4	4	4	4	4	4
14	5	5	5	4	5	5	5
15	5	5	5	5	5	5	5
16	4	5	5	5	5	5	5
18	5	2	2	3	4	4	4
19	4	4	5	4	5	5	4
20	3	3	2	4	3	1	3

Conversion scale for letter grades: A=5; B=4; C=3; D=2; F=1

TABLE 3 (continued)

Subject #	Reading	Language	Spelling	Handwriting	Social Studies	Math	Science
22	4	5	5	5	5	5	5
26	5	4	5	5	5	4	4
27	3	4	5	5	4	4	4
28	5	5	5	5	5	5	5
29	4	4	5	3	4	4	5

Conversion scale for letter grades: A=5; B=4; C=3; D=2; F=1

TABLE 4

INDIVIDUAL SCORES ON THE CAT

Subject #	Reading	Spelling	Math	Language
1	51	15	65	45
2	20	11	18	16
4	61	16	80	57
7	36	10	53	40
10	49	18	33	48
13	39	11	58	41
14	41	14	55	45
15	53	10	69	41
16	59	12	73	53
18	63	14	53	46
19	46	17	60	38
20	25	11	20	14
22	62	10	65	52
26	40	9	42	36
28	63	16	73	55
29	25	7	29	33

DATA ANALYSIS

The Pearson Product Moment Correlation was used to examine the correlation between the Test of Adolescent Language and the Fullerton Language Test for Adolescents.

A factor analysis was applied to this correlation to determine how many language behaviors were being tested and how each subtest was distributed in each factor.

The Spearman Rank Correlation was used to determine whether or not there was a significant relationship between performance on the language tests and academic performance and the Pearson Product Moment Correlation was again applied to examine the correlation between language test performance and achievement test performance.

CHAPTER IV

RESULTS

Language Tests

The scores attained by the subjects on the TOAL and the range, mean, and standard deviation appear in Table 5. The mean score for the TOAL was 56.033. The scores attained on the Fullerton appear in Table 6 along with the range, mean, and standard deviation of these scores. The mean score for the Fullerton was 141.066.

Analysis of Data

To test null hypothesis (1) there is no significant correlation between the Test of Adolescent Language and the Fullerton Language Test for Adolescents, the Pearson Product Moment Correlation was applied to the two sets of scores. The correlation for the total scores of the TOAL and the Fullerton revealed a high positive correlation (r=.8209, p=.000). From this correlation, it can be stated that 67 percent of the variance of one of these tests is predictable from the variance of the other test (r^2=.67). Therefore, when giving these tests an examiner would know 67 percent of what would have to be known to make a perfect prediction of the one variable from the other.

The results of the overall values of the variables within these two tests revealed that 62 of the 64 correlations showed a significant difference from zero ($\leq$.05). From the results of the Pearson Product Moment Correlation for the total scores and over values from the TOAL

TABLE 5

INDIVIDUAL RAW SCORES ON THE TOAL

Subjects	*Subtests								Total
	LV	LG	SV	SG	RV	RG	WV	WG	
1	5	24	8	15	7	17	1	0	77
2	0	2	1	2	1	0	0	0	6
3	4	16	6	10	6	7	1	3	53
4	5	10	4	6	2	0	0	0	27
5	3	8	2	7	0	1	0	2	23
6	9	25	4	14	0	19	3	16	90
7	6	4	3	3	2	1	0	0	19
8	4	4	5	6	3	9	3	0	34
9	2	13	3	2	4	0	0	0	24
10	4	6	10	6	8	14	8	4	60
11	6	18	5	17	12	17	6	5	86
12	3	22	2	9	3	2	0	1	42
13	3	12	4	8	11	0	1	3	42
14	5	27	1	12	5	18	0	7	75
15	8	7	4	4	6	3	1	5	38
16	11	15	5	14	9	16	6	6	82
17	4	14	10	11	5	7	8	1	60
18	18	18	15	13	8	11	9	8	100
19	4	22	3	7	14	15	1	0	66
20	1	4	2	3	2	4	0	0	16
21	3	15	2	9	4	5	3	1	42
22	11	14	12	17	13	5	4	2	78
23	18	24	11	11	18	15	8	3	108
24	10	11	4	12	4	2	2	4	49
25	0	9	4	2	6	1	0	2	24
26	5	29	9	15	14	13	1	7	93

TABLE 5 (continued)

Subjects	*Subtests								Total
	LV	LG	SV	SG	RV	RG	WV	WG	
27	9	15	5	12	11	6	3	2	63
28	15	16	13	15	14	17	9	14	113
29	3	10	7	13	3	4	1	2	43
30	8	5	4	6	11	6	1	7	48
Range	0-18	2-29	1-15	2-17	0-18	0-19	0-9	0-16	6-113
Mean	6.23	13.96	5.60	9.36	6.86	7.83	2.66	3.50	56.03
S.D.	4.70	7.49	3.73	4.69	4.83	6.58	3.08	3.99	29.119

*Key to Subtests

LV - Listening/Vocabulary

LG - Listening/Grammar

SV - Speaking/Vocabulary

SG - Speaking/Grammar

RV - Reading/Vocabulary

RG - Reading/Grammar

WV - Writing/Vocabulary

WG - Writing/Grammar

TABLE 6

INDIVIDUAL RAW SCORES ON FULLERTON

Subjects	*Subtests								Total
	AS	MC	OC	CP	DP	SY	GC	Idioms	
1	12	16	16	28	36	16	14	4	142
2	4	9	5	14	21	5	18	0	76
3	7	14	18	28	38	9	16	4	134
4	4	13	16	28	49	12	17	2	141
5	6	15	14	24	45	9	14	2	132
6	17	16	19	35	56	19	17	4	183
7	5	12	9	20	29	11	10	1	97
8	10	13	13	29	27	15	14	5	126
9	3	11	12	28	43	11	12	9	129
10	10	16	16	28	46	19	16	3	154
11	14	15	19	35	39	14	17	7	160
12	8	17	16	28	25	15	15	3	127
13	8	17	14	28	43	12	16	5	143
14	18	17	20	34	34	15	17	6	161
15	7	15	18	30	47	9	15	3	144
16	14	18	17	32	39	15	15	5	155
17	12	13	17	30	32	10	17	4	135
18	13	18	17	31	41	15	16	10	161
19	17	16	17	37	40	17	17	3	164
20	3	6	13	10	11	0	13	4	60
21	11	12	15	27	35	7	18	4	129
22	17	19	20	38	48	15	18	10	185
23	13	16	15	35	46	17	18	9	169
24	10	17	15	31	37	15	16	7	148
25	9	14	10	27	33	14	16	6	129
26	7	15	17	35	43	18	19	7	161

TABLE 6 (continued)

Subjects	*Subtests								Total
	AS	MC	OC	CP	DP	SY	GC	Idioms	
27	14	16	13	27	51	20	16	8	165
28	15	20	16	40	55	14	19	9	188
29	4	15	13	26	29	10	13	3	113
30	8	15	8	24	31	15	17	4	122
Range	3-18	6-20	5-20	10-40	11-56	0-20	10-19	0-10	60-188
Mean	9.96	14.86	14.93	28.90	38.30	13.10	15.86	5.13	141.06
S.D.	4.57	2.90	3.53	6.42	10.10	4.42	2.80	2.60	29.179

*Key to Subtests

AS - Auditory Synthesis

MC - Morphology Competency

OC - Oral Commands

CP - Convergent Production

DP - Divergent Production

SY - Syllabication

GC - Grammatic Competency

Idioms

and the Fullerton the null hypothesis was rejected. The complete correlation matrix appears in Appendix D.

There are two possible explanations for the low correlations achieved between the following sets of variables: RV and OC (r=.2661, p=.078) and RG and Idioms (r=.2664, p=.077). One is that two different language behaviors were being tested. The subtests, RV and Idioms focus on semantic abilities whereas OC and RG involve auditory memory and grammatic (syntactic) abilities. Also, different forms of language were being tested: RV and RG - written form, OC and Idioms - spoken form.

The correlation of the variables within the Test of the Adolescent Language revealed significant correlations with the following exceptions: SV and LG (r=.2492, p=.092); WV and LG (r=.1767, p=.175); and WG and RV (r=.2213, p=.120). These variables may be testing two different language behaviors. The variables, SV, WV, and RV are focusing on the semantic features of language while LG and WG are focusing on the grammatic (syntactic) features of language. Also there are different systems of language being tested: receptive (LG and RV), and expressive (SV, WV, and WG). The correlation matrix appears in Appendix E.

The correlation of the variables within the Fullerton Language Test for Adolescents revealed significant correlations with the following exceptions: GC and SY (r=.2978, p=.074); GC and Idioms (r=.2702, p=.074). These variables may be testing different language behaviors. The variable GC assesses the grammatic feature of language, and SY and Idioms assess the semantic area of language. The correlation matrix appears in Appendix F.

To test null hypothesis (2), there is no significant correlation between the total performance on the Test of Adolescent Language, the Fullerton Language Test for Adolescents and academic performance, the Spearman rank correlation coefficient was applied to the academic grades and total test performance on the TOAL and Fullerton at the .05 level of significance.

Five of the seven academic areas had a significant correlation with total test performance on the Fullerton. The results are shown in Table 7, Spearman Rank Correlation Coefficients for Academic Performance with Total Fullerton Results.

Four of the seven academic areas had a significant correlation with total test performance of the TOAL. The results are shown in Table 8, Spearman Rank Correlation Coefficients for Academic Performance with Total TOAL Results. From the results of these correlations it can be concluded that there is a significant correlation between total performance on these two tests and academic performance, therefore, the null hypothesis was rejected.

To test null hypothesis (3), there is no significant correlation between the total performance of the Test of Adolescent Language, the Fullerton Language Test for Adolescents and performance on the California Achievement Test, a Pearson Product Moment Correlation was applied to the total scores of all three tests. The CAT Total with the Fullerton Total revealed a significant correlation ($r=.7953$, $p=.000$). The CAT Total with the TOAL Total also had a significant correlation ($r=.5801$, $p=.007$). Therefore, based on these results, the null hypothesis was rejected.

TABLE 7

SPEARMAN RANK CORRELATION COEFFICIENTS FOR ACADEMIC PERFORMANCE WITH TOTAL FULLERTON RESULTS

	F Total
Reading	r_s = .4107 *p = .051
Language	r_s = .3829 *p = .065
Spelling	r_s = .5009 p = .020
Handwriting	r_s = .4536 p = .034
Social Studies	r_s = .6625 p = .002
Math	r_s = .5543 p = .010
Science	r_s = .4918 p = .022

*not significant at $\leq$ .05

TABLE 8

SPEARMAN RANK CORRELATION COEFFICIENTS FOR ACADEMIC PERFORMANCE WITH TOTAL TOAL RESULTS

Academic Subjects	T Total
Reading	$r_s = .5166$ $p = .017$
Language	$r_s = .3481$ *$p = .085$
Spelling	$r_s = .3900$ *$p = .061$
Handwriting	$r_s = .2805$ *$p = .138$
Social Studies	$r_s = .5678$ $p = .009$
Math	$r_s = .5132$ $p = .018$
Science	$r_s = .4906$ $p = .023$

*not significant at $\leq .05$

Factor Analysis

A factor analysis was performed to determine the number of factors that appear from the correlation. This showed which variables within the factors were good predictors of other variables in that factor.

The analysis revealed three factors that apply to the correlation, suggesting that three language behaviors were being tested. Table 9, Factor Matrix, shows how each variable loads on each factor. The high loading variables are: Factor 1 - AS, OC, GC, LG, SG, RG, and WG; Factor 2 - Idioms, LV, SV, RV, and WV; Factor 3 - MC, CP, DP, and SY. The best predictor for Factor 1 is RG, for Factor 2, WV, and for Factor 3, DP.

A summary of the three language behaviors being tested is as follows: Factor 1 - grammatic features and auditory memory; Factor 2 - semantic features (vocabulary); Factor 3 - semantic features associated with changes in meaning.

Appearing in Appendix G is the distribution of Factor 2 against Factor 1. Variables 12(SG), 1(AS), 14(RG), 10(LG) and 3(OC) show a heavier loading in Factor 1 (horizontal) shown by the grouping to the right of the axis. Factor 2 (vertical) shows a heavier loading for variables 5(DP), 6(SY), 2(MC), and 4(CP) in Factor 3 (vertical).

In Appendix H, appears the distribution of Factor 3 against Factor 1. Variables 1(AS), 10(LG), 12(SG), and 14(RG) show a heavier loading in Factor 1 (horizontal) and a heavier loading for variables 5(DP), 6(SY), 2(MC), and 4(CP) in Factor 3 (vertical).

TABLE 9

FACTOR MATRIX

Fullerton	Factor 1	Factor 2	Factor 3
AS	*0.7314	0.29448	0.33064
MC	0.41272	0.32164	*0.71562
OC	*0.74013	0.10615	0.28067
CP	0.59529	0.28932	*0.65776
DP	0.21135	0.25224	*0.78131
SY	0.38386	0.16241	*0.71800
GC	*0.48316	0.31503	0.17870
Idioms	0.13032	*0.58549	0.47195
TOAL			
LV	0.22234	*0.74219	0.38462
LG	*0.78806	-0.01336	0.34890
SV	0.17254	*0.85497	0.19839
SG	*0.70899	0.37277	0.27335
RV	0.25644	*0.55462	0.41180
RG	*0.83598	0.30191	0.06995
WV	0.30754	*0.86715	0.02877
WG	*0.48986	0.31644	0.29024

*high loading variables

In Appendix I is the distribution of Factor 3 against Factor 2. Variables 5(DP), 6(SY), 4(CP), and 2(MC) show a heavier loading in Factor 3 because of the high position on the axis. Variables 8(Idioms), 13(RV), 9(LV), 11(SV), 15(WV) show a heavier loading in Factor 2 by the position to the right of the horizontal axis.

These distributions reveal that when the factors are plotted against one another on a graph the higher loading variables in the factor will be either high on the vertical axis or far to the right on the horizontal axis.

CHAPTER V

SUMMARY, DISCUSSION, RECOMMENDATIONS

Summary

This study had two purposes, the first purpose was to determine whether or not there was a significant correlation between the Test of Adolescent Language and the Fullerton Language Test for Adolescents. The second purpose was to examine the relationship of performance on these two tests of adolescent language with academic performance and school achievement.

Thirty sixth grade subjects were involved in this study. Each subject was administered the TOAL and the Fullerton. Seventeen of the subjects agreed to have their academic grades and achievement test scores examined for the second purpose of this study.

The data were analyzed by means of the Pearson product moment correlation and the Spearman rank correlation coefficient. A factor analysis was applied to the total test results.

Discussion

The significant correlation between overall performance on the Test of Adolescent Language and the Fullerton Language Test for Adolescents seem to indicate that these tests evaluate same areas of language. Therefore, variables from one of the tests can be expected to predict the outcome of performance on variables from the other test. Speech/language pathologists can therefore use these tests interchangeably

and expect the performance on each to be the same with regards to the amount of variance for each variable.

The results of the Spearman rank correlation revealed a significant correlation between academic performance and total performance on the Test of Adolescent Language and the Fullerton Language Test for Adolescents, therefore, null hypothesis (2) was rejected.

The correlation between academic scores and total TOAL scores revealed significant correlations for four out of seven of the correlations. The significance levels for the three nonsignificant correlations were not far beyond the .05 level, however, the trend was towards this level of significance. Because an overall value could not be assigned to the subject's academic performance, i.e., grade point average, it was not possible to compute a single correlation between academic performance and overall performance on either the TOAL or the Fullerton. From this close correlation, it is evident that if it had been possible to compute an overall grade point average, a significant correlation between these variables may have been demonstrated. Because of the correlation that did result, the TOAL appears to be testing overall cognitive abilities not exclusively language arts: reading, language, and spelling.

The correlation between academic scores and total Fullerton scores revealed significant correlations for five out of seven of the correlations. As mentioned previously in this study, an overall grade point average would probably be significant to the overall test performance.

From the results of the Spearman rank correlation, it is suspected that the areas of language being tested in the TOAL and Fullerton are representative of the language skills required in the academic areas of

Social Studies, Math, and Science. It can therefore be concluded that language encompasses all academic areas as a necessary skill for learning.

The total results of the TOAL and the Fullerton did not correlate significantly with language performance in the classroom. There are a few explanations being that overall academic scores were not computed as discussed earlier. The probabilities of chance in correlations may explain these results. However, in the sixth grade classroom other aspects of language arts are being emphasized other than the ones tested on the TOAL and the Fullerton. However, it is not possible through this study to give a definite explanation but should be a consideration for further research.

The application of the Pearson Product Moment Correlation to the total CAT scores with total TOAL and total Fullerton revealed a significant correlation, therefore, the null hypothesis was rejected. This relationship reveals that these adolescent language tests are good predictors of the overall achievement on the California Achievement Test.

A Factor Analysis was applied to the results of the Pearson Product Moment Correlation of the TOAL and the Fullerton. The results of the factor analysis revealed three factors, meaning three language behaviors are being tested within these tests. A discussion of the three factors and the variables contained in these factors is as follows in this section.

In Factor 1, the area that is being tested is the grammatical feature of language represented by the four modalities: listening, speaking, reading, and writing. All four subtests of the Test of Adolescent Language that utilize the grammatic feature of language were grouped in

this factor. Three subtests of the Fullerton Language Test for Adolescents were included in the factor. GC (Grammatic Competency) tests the ability to identify whether a sentence, presented orally, is grammatically correct. OC (Oral Commands) focuses on the ability to perform tasks that vary in syntactical (grammatic) difficulty. This subtest also focuses on the ability to retain and retrieve information utilizing auditory memory skills. AS (Auditory Sunthesis) utilizes the ability to combine individual sounds and syllables into words. This tests an individual's auditory memory and the ability to comprehend messages presented orally. RG (Reading/Grammar) and WG (Writing/Grammar) focus on syntactical abilities whereas SG (Speaking/Grammar), LG (Listening/Grammar), GC (Grammatic Competency), and OC (Oral Commands) look at syntactic abilities combined with auditory memory.

In Factor 2 the area being tested is the semantic feature of language. The four subtests of the Test of Adolescent Language, SV, LV, RV, and WV, that utilize this feature are grouped in this factor. The Idioms subtest of the Fullerton Language Test for Adolescents is also included in the group. Idioms assesses the ability to understand multiple meanings of words. This semantic concept will help an individual understand the intent of messages.

Factor 3 tests an aspect of vocabulary focusing on changes in meaning and categorizing words. MC (Morphology Competency) assesses the ability to demonstrate the understanding of words and their root words. The knowledge of root words will aid in the understanding of changes in word meaning when a prefix or suffix is added. The variable, CP (Convergent Production) requires an individual to understand that a word may

have different meanings even though it does not change pronunciation. DP (Divergent Production) requires an understanding of the stimulus word and an ability to retrieve those items included in the given category. SY (Syllabication) determines whether or not an individual can use and understand the prosodic features of language. With this ability, comes the understanding of the change in meaning associated with prosodic features.

In Table 9, the high loading variables in each factor are presented. It can be estimated from this analysis which variable in each factor will be the best predictor of performance on the other variables within the factor. For example, in Factor 1, the highest loading variable was RG. Therefore, if an examiner were testing the grammatic abilities of an individual, the performance on the other variables could be estimated from the results obtained on the RG variable. In Factor 2, the highest loading variable was WV, therefore, it is the best predictor for the area of semantics within the TOAL and the Fullerton. In Factor 3, DP was the highest loading variable, therefore it is the best predictor for the estimation of performance in the area of vocabulary focusing on changes in meaning and categorization for the TOAL and the Fullerton.

In conclusion, the results of the data analysis revealed that the TOAL and the Fullerton are testing the same areas of language. It was determined that three language behaviors were being tested within these instruments. These tests were also determined to be good predictors of academic performance and school achievement.

Recommendations for Further Research

An important consideration for further research would be to determine the relationship between these two tests of adolescent language and the language skills and performance in the classroom. It would also be interesting to determine how the language skills in other academic areas, not just language arts, relate to the areas of language being assessed in these instruments.

The Fullerton, being an experimental edition, still needs further investigation. Test-retest studies should be conducted that involve language and/or learning disabled adolescents to determine stability. The Fullerton is presently being correlated with the Clinical Evaluation of Language Functions. The TOAL has not been correlated with a diagnostic test for adolescents. To complete the project being conducted at the present time, a correlation study should be conducted on the TOAL and the CELF.

Studies involving larger populations in different areas would help determine how various students perform on these tests. A longitudinal study is another possibility to determine predictive validity.

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APPENDIX A

DESCRIPTION OF TOAL SUBTESTS

DESCRIPTION OF TOAL SUBTESTS

Subtest I: Listening/Vocabulary:

This subtest utilizes the spoken form measuring receptive language skills with 28 items. The student is required to select two out of four pictures which meanings relate to the stimulus word... This procedure requires the student to demonstrate that they know more than one meaning of the stimulus word.

Subtest II: Listening/Grammar:

This subtest utilizes the spoken form measuring receptive language. This subtest has 35 items. The instructor reads three sentences and the student is to choose two out of the three sentences which express the same idea and/or meaning.

Subtest III: Speaking/Vocabulary and Subtest VII: Writing/Vocabulary:

These subtests utilize the spoken form measuring expressive language. The passing criteria of these subtests requires the student to use the stimulus word correctly in a sentence whether it be said aloud by the examiner or read silently by the student. Hammill (1980) looked at measuring vocabulary by incorporating lexical and class usage. They felt an adolescent who knows a word's class would be able to use the word in a meaningful sentence even though the individual may not know the specific meaning of the word.

Subtest IV: Speaking/Grammar:

This subtest utilizes the spoken form measuring expressive language. This subtest involves having the examiner read a sentence and the student repeats the sentence heard.

Subtest V: Reading/Vocabulary:

This subtest utilizes the written form measuring receptive language. The student uses silent reading and does not have to verbalize a response. The student reads three stimulus words then must pick two out of the four words listed under the stimulus words that are most closely associated with the three stimulus words.

Subtest VI: Reading/Grammar:

This subtest utilizes the written form measuring receptive language. The student is required to read five sentences and select two out of the five sentences that are closest in meaning.

Subtest VIII: Writing/Grammar:

This subtest utilizes the written form measuring expressive language. The student is required to read a series of short sentences silently and combine them into one sentence.

(Hammill, 1980)

APPENDIX B

DESCRIPTION OF FULLERTON SUBTESTS

DESCRIPTION OF FULLERTON SUBTESTS

Subtest I: Auditory Synthesis - assesses the ability to synthesize phonemic sounds or units of sounds that are presented separately in one word or utterance.

Part A: Phonemes - series of actual or nonsense words, phonemes are spoken at intervals by the examiner, requiring the individual to blend the phonemes together to produce words.

Part B: Syllables - series of actual or nonsense words syllable spoken in intervals and blended together by the student. 20 items

Subtest II: Morphology Competency - assesses the ability to analyze the morphological elements of words and to demonstrate competency in correct usage. Examiner presents a word orally, individual makes a sentence or utterance to demonstrate an understanding of the word and its morphological rule.

Part A: Suffixes - contains 15 root words plus a variety of bound morphemes.

Part B: Prefixes - contains 5 root words and a variety of bound morphemes. 20 items (tape recorded)

Subtest III: Oral Commands - assesses the ability to perform a number of tasks that vary in length and syntactical complexity. 20 items

Subtest IV: Convergent Production - assesses the ability to identify, retrieve, and formulate responses to different words that have specific meanings. Vocabulary power and performance retrieval from long-term memory. Examiner says the key word and asks for as many examples of the word as possible. 75 items

Subtest V: Divergent Production - assesses the ability to categorize, retrieve, and formulate responses that satisfy the semantic expansion imposed by the context. The individual is presented with five different categories. He must name as many members of each class as possible in 20 seconds.

Subtest VI: Syllabication - assesses the ability to identify syllables and to detect the number of syllables in words. 20 items

Subtest VII: Grammatic Competency - assesses the ability to identify whether a sentence presented orally is grammatically correct or incorrect and to present a correct form where appropriate. 20 items

Subtest VIII: Idioms - assesses the ability to identify the underlying meaning of utterances that may have several meanings. 20 items

(Thorum, 1980)

APPENDIX C

ORDER OF TESTING

ORDER OF TESTING

SUBJECTS	TEST 1	TEST 2	TEST 3	TEST 4
S1	Fullerton	TOAL (I)	TOAL (G)	CELF
S2	CELF	Fullerton	TOAL (I)	TOAL (G)
S3	TOAL (I)	Fullerton	TOAL (G)	CELF
S4	Fullerton	TOAL (I)	TOAL (G)	CELF
S5	CELF	Fullerton	TOAL (I)	TOAL (G)
S6	TOAL (I)	Fullerton	TOAL (G)	CELF
S7	Fullerton	TOAL (I)	TOAL (G)	CELF
S8	CELF	Fullerton	TOAL (I)	TOAL (G)
S9	Fullerton	TOAL (I)	TOAL (G)	CELF
S10	Fullerton	TOAL (I)	TOAL (G)	CELF
S11	CELF	TOAL (I)	Fullerton	TOAL (G)
S12	Fullerton	TOAL (I)	TOAL (G)	CELF
S13	Fullerton	TOAL (I)	TOAL (G)	CELF
S14	CELF	Fullerton	TOAL (I)	TOAL (G)
S15	Fullerton	TOAL (I)	TOAL (G)	CELF
S16	Fullerton	TOAL (I)	TOAL (G)	CELF
S17	CELF	TOAL (I)	Fullerton	TOAL (G)
S18	Fullerton	TOAL (I)	TOAL (G)	CELF
S19	Fullerton	TOAL (I)	TOAL (G)	CELF
S20	CELF	TOAL (I)	Fullerton	TOAL (G)
S21	Fullerton	TOAL (I)	TOAL (G)	CELF
S22	Fullerton	TOAL (I)	TOAL (G)	CELF
S23	CELF	Fullerton	TOAL (I)	TOAL (G)
S24	Fullerton	TOAL (I)	TOAL (G)	CELF
S25	Fullerton	TOAL (I)	TOAL (G)	CELF
S26	CELF	Fullerton	TOAL (I)	TOAL (G)
S27	CELF	Fullerton	TOAL (I)	TOAL (G)
S28	Fullerton	TOAL (I)	TOAL (G)	CELF
S29	CELF	Fullerton	TOAL (I)	TOAL (G)
S30	Fullerton	TOAL (I)	TOAL (G)	CELF

APPENDIX D

COMPLETE CORRELATION MATRIX OF THE TOAL AND FULLERTON

COMPLETE CORRELATION MATRIX OF THE

TOAL AND FULLERTON

	AS	MC	OC	CP	DP	SY	GC	Idioms
LV	r=.5277 p=.001	r=.6249 p=.000	r=.3455 p=.031	r=.5494 p=.001	r=.5234 p=.001	r=.4566 p=.006	r=.3100 p=.048	r=.6099 p=.000
LG	r=.5950 p=.000	r=.4945 p=.003	r=.6494 p=.000	r=.6701 p=.000	r=.3766 p-.020	r=.5358 p=.001	r=.4153 p=.011	r=.3879 p=.017
SV	r=.3521 p=.028	r=.5054 p=.002	r=.3505 p=.029	r=.4990 p=.002	r=.4116 p=.012	r=.3760 p=.020	r=.3255 p=.040	r=.5642 p=.001
SG	r=.6509 p=.000	r=.6754 p=.000	r=.6691 p=.000	r=.6754 p=.000	r=.4129 p=.000	r=.4834 p=.012	r=.4290 p=.009	r=.4970 p=.003
RV	r=.4957 p=.003	r=.5259 p=.001	r=.2661 *p=.078	r=.5955 p=.000	r=.4070 p=.013	r=.5042 p=.002	r=.5195 p=.002	r=.5565 p=.001
RG	r=.7431 p=.000	r=.4562 p=.006	r=.5616 p=.001	r=.6010 p=.000	r=.3245 p=.040	r=.5505 p=.001	r=.3736 p=.021	r=.2664 *p=.077
WV	r=.5287 p=.001	r=.4400 p=.007	r=.3582 p=.026	r=.4810 p=.004	r=.3758 p=.020	r=.3384 p=.034	r=.3847 p=.018	r=.4720 p=.004
WG	r=.4761 p=.004	r=.5307 p=.001	r=.3687 p=.022	r=.5091 p=.002	r=.5205 p=.002	r=.3971 p=.015	r=.4271 p=.009	r=.3272 p=.039

*no significant correlation

APPENDIX E

CORRELATION MATRIX OF THE TOAL

CORRELATION MATRIX OF THE TOAL

	LV	LG	SV	SG	RV	RG	WV
LG	r=.3229 p=.041						
SV	r=.6685 p=.000	r=.2492 *p=.092					
SG	r=.5396 p=.001	r=.6675 p=.000	r=.5432 p=.001				
RV	r=.5339 p=.001	r=.4156 p=.011	r=.5543 p=.001	r=.4460 p=.007			
RG	r=.4481 p=.007	r=.6489 p=.000	r=.3953 p=.015	r=.6305 p=.000	r=.4600 p=.005		
WV	r=.6821 p=.000	r=.1767 *p=.175	r=.7795 p=.000	r=.4892 p=.003	r=.4820 p=.003	r=.5383 p=.001	
WG	r=.5475 p=.001	r=.3801 p=.019	r=.3323 p=.036	r=.4860 p=.003	*r=.2213 p=.120	r=.5773 p=.000	r=.4133 p=.012

*no significant correlation

APPENDIX F

CORRELATION MATRIX OF THE FULLERTON

CORRELATION MATRIX OF THE FULLERTON

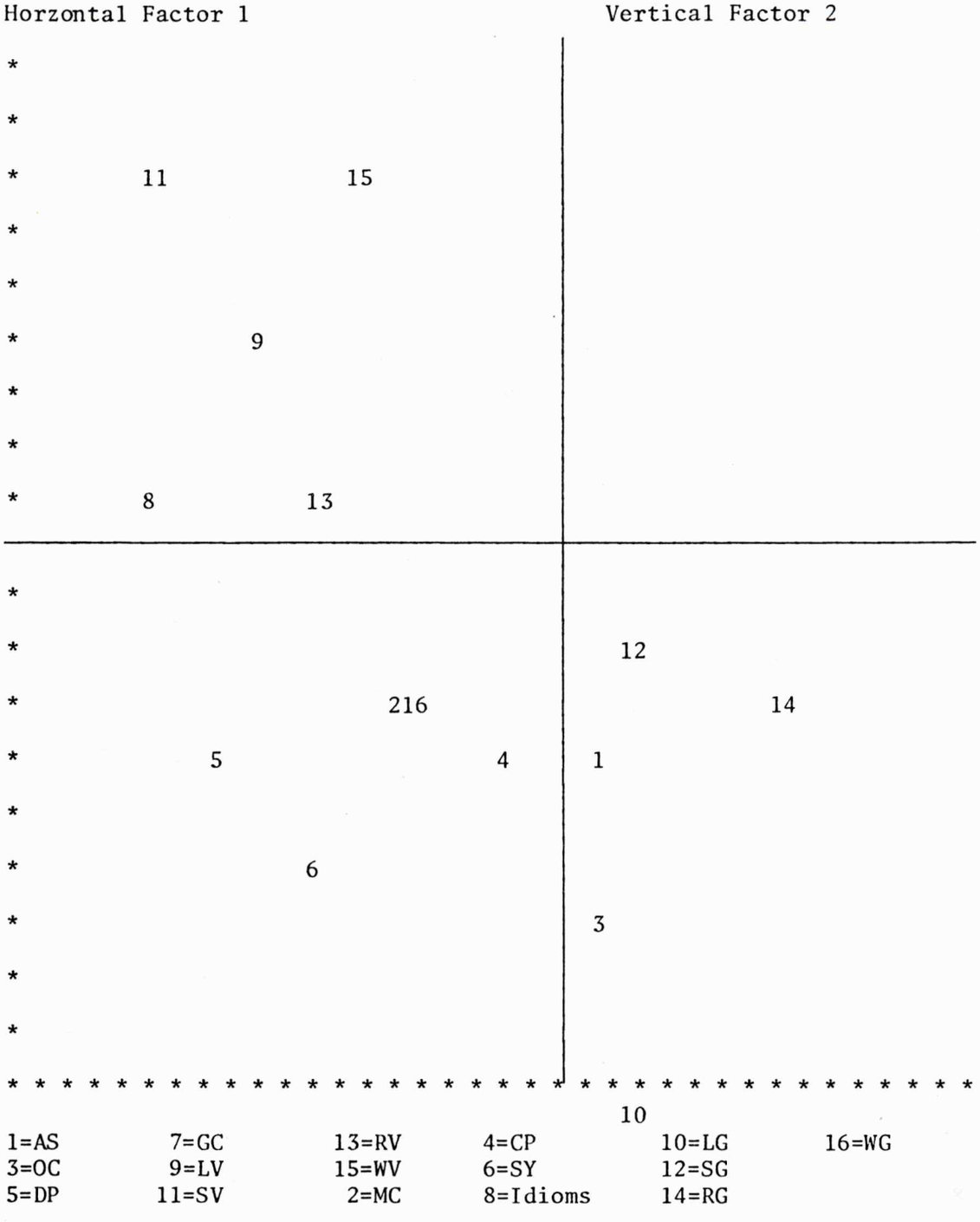
	AS	MC	OC	CP	DP	SY	GC
MC	r=.6629 p=.000						
OC	r=.5994 p=.000	r=.5393 p=.001					
CP	r=.7361 p=.000	r=.7975 p=.000	r=.7148 p=.000				
DP	r=.4360 p=.008	r=.6304 p=.000	r=.4867 p=.003	r=.7052 p=.000			
SY	r=.6242 p=.000	r=.7223 p=.000	r=.3383 p=.034	r=.6932 p=.000	r=.5809 p=.000		
GC	r=.5068 p=.002	r=.3673 p=.023	r=.3179 p=.043	r=.5147 p=.002	r=.3861 p=.018	r=.2978 *p=.055	
Idioms	r=.4365 p=.008	r=.4748 p=.004	r=.3489 p=.029	r=.5578 p=.001	r=.4511 p=.006	r=.3814 p=.019	r=.2702 *p=.074

*no significant correlation

APPENDIX G

DISTRIBUTION OF FACTOR 2 AGAINST FACTOR 1

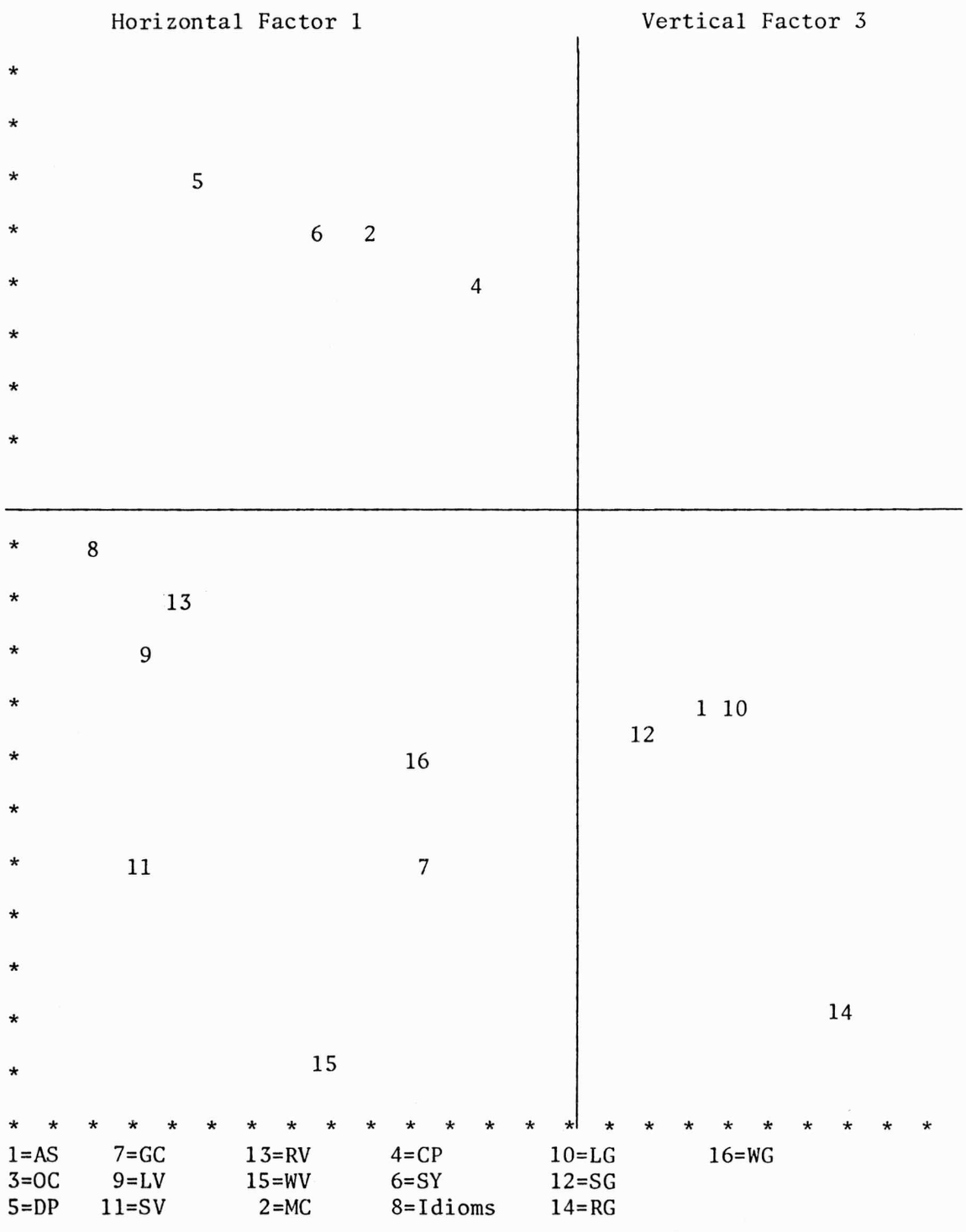
DISTRIBUTION OF FACTOR 2 AGAINST FACTOR 1



APPENDIX H

DISTRIBUTION OF FACTOR 3 AGAINST FACTOR 1

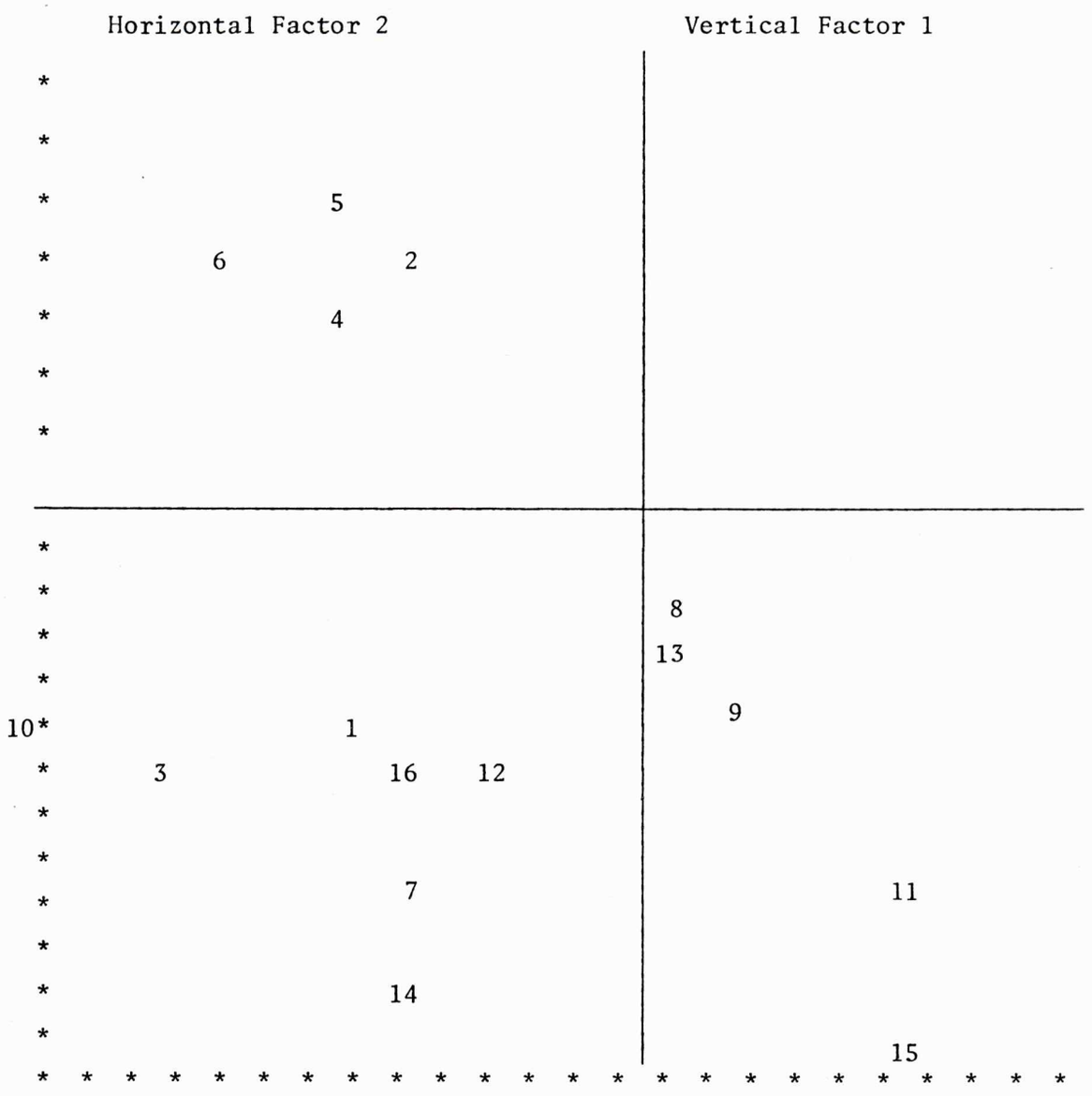
DISTRIBUTION OF FACTOR 3 AGAINST FACTOR 1



APPENDIX I

DISTRIBUTION OF FACTOR 3 AGAINST FACTOR 2

DISTRIBUTION OF FACTOR 3 AGAINST FACTOR 2



VITA

Ann Marie C. Heffron was born in Raleigh, North Carolina on January 20, 1959. She attended elementary schools in that city and was graduated from William G. Enloe High School in June 1977. The following September she entered Appalachian State University, and in May 1981 she received a Bachelor of Science degree in Speech Pathology and Audiology. In the summer of 1981 she began study toward a Master's degree at Appalachian State University. This degree was awarded in May 1982 in the field of Speech Pathology.

The author is a member of the National Student Speech Language - Hearing Association and the Dean's Student Advisory Council.

Ms. Heffron's address is: 420 Fenton St., Raleigh, North Carolina 27604.

Her parents are Mr. and Mrs. John F. Heffron of Scranton, Pennsylvania.